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TEACHING PORTFOLIO

JOHN NIELAND



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My explanation of the cover: As a teacher we have a finger in to drops of knowledge we put into the class or individual student with the hope that these drops spreads in the mind of the students making them extend their boundaries of seeing the world and the matter they received, gaining a multiplicity of know how out of the small drops that initiated it.

Introduction

Teaching is something everyone has done at some point in his life at some level. It can be when showing your friends or family members what you have done or found, or teaching your children while they grow up, working in a company giving know how on to ones employees, colleagues or bosses, being head of a company trying to get investors being interested to invest, being part of a sports club, being a teacher at one or the other school or university or being a pet owner teaching the pet to do things.

Looking over the list, I can say that I have done all of the things above, with good or less good and bad results. Afterwards I can see in some cases where I went wrong or what went right, But not in all cases. In several cases it was due to a lack of preparation, but often it was also or was exclusively a case of do not have the right techniques or not the appropriate techniques at hand. The goal of this course was therefore, to gain insight in, and expand my know how of teaching techniques to use and learning how to setup lectures.

Topics for this portfolio

Having lived and worked in different countries, like the Netherlands, USA, Germany and Denmark, I have taught in different languages. When I was hired to teach at the Aarhus University Engineering College, I was specifically asked to teach in English, since this would be a valuable experience and a good training for the students. In the beginning this was also good for me since my Danish, when I started to teach, was not so good. However, in the mean time I followed courses in Danish to improve my language skills and can now teach in both English as well as Danish if needed.

My background is in research, both fundamental as well as applied research. I have studied and worked as a research technician and after finishing my Masters followed by my PhD in Medicine, I have done research at



universities as well as in biotech companies. My strengths are in thinking differently and out of the box. Just because someone tells you something's are in certain way does not per se mean it can not also be another way. The world in which we live has per definition multiple realities. Depending on where you stand and what you look at you can see different things, as you can see in the 2 pictures of a sculpture

created by Arthur Silverman, titled Painted Trio. If you look from one side at the sculpture, you see just green triangles, while looking at the other side you see green and red triangles connected to each other.

This is the same in research if someone publishes a result and someone else publishes different results on the same topic, it does not have to mean one of them is wrong. It could well be that they are both right and one has to find a way to make the different results fit together. The only way to find out is test. A good researcher believes results to be right when they can be repeated, and based on these results he makes a hypothesis that he tests. This is not only a theme in research but also in other aspects of society and in particularly teaching. If a student or teacher thinks differently or explains things differently based on general know how of material it does not mean the one or the other is wrong. It just means it is a different way of looking at it, interpreting it which both if based on the context they were in and the know how each of them has. In other words there are different realities in all we look at, do or experience and these realities depend on the framework or context they are placed or developed.

This is a way of systemic thinking that I believe in and try to use as much as possible for my teaching. It is being tested what the effect is of systemic thinking on teaching both on ground school (John Jakobsen, Faaborg Midtfyn Kommune, Østerågade 40, 5672 Broby) as well as advanced level by the VIA university (Ole Hansen, Professionshøjskolen, University College Nordjylland). In systemic thinking one focusses on the relation and communication between different individuals in a group and not the single individual. The systemic thinking focusses on optimization of the interaction of the different individuals in a group and therewith improves the working processes in the group which influence the final outcome.

One of the differences in thinking between systemic thinking and other ways of thinking is that it is based on that the context of a group or system is dynamic. This means with all we do or with things that change the context of a process is changed. A direct effect of this is that, for instance you change things by measuring things. When I analyze a group by asking questions about the functioning of the group I change their interaction. This also means that one can steer a group in a direction by asking questions in general. In systemic thinking circular questions are very important (these are questions where that what you ask about is presumed to be right, P. Penn 1982, and Wikipedia), It is crucial though that the one that asks the questions or is doing the research tries to stay neutral. This is one of the strong points in systemic thinking (P. Penn 1982, Cecchin 1987).

One method one uses in this context is appreciative inquiry, which means that one tries to imagine the future to be better or focus on that the solution to a situation or problem will come. Also one focusses on that the people that are present in the group are exactly the people one need to solve the task, and come forward. With that one creates a constructive development process. Coupled with that is the heliotropical principle. Heliotropical means Helio, the sun and tropical means turning to, in other words turning to the sun. This term comes from plant biology where the sunflower turns to the sun to grow better. This is also in group works where people focus on the positive future. One tries to go in that direction where the group grows best. This is where the sun is or where the brightest future lies. The disadvantage of this method is of course that one could shoot besides the goal in certain situations. For instance, in a company one could miss a product to be

developed because the group was not optimal for the task. In addition focusing on just a positive way could make the road to get there longer. Sometimes it is better to take a less positive or more difficult road to get to the best end result.

The main topics of my portfolio I will go into 2 main points, one is on using a foreign language in teaching, and if you do how important is it to also be able to speak Danish. The other topic is research in teaching, how to integrate research in teaching. In addition, I will go into 3 courses I have given and which I developed over time with respect to the topics and the exam that is part of the courses.

Teaching CV

My first teaching experience was when I was 15 years old and training a group of 8-10 years old children play Korfball, a Dutch sport. I had to teach them basic skills and also tactics. I met here all kinds of different children. Some of which were interested in learning and some that were interested in making trouble. It was a good and a hard learning experience at the same time which was rewarded by seeing the group perform better and better every week. The next experience was when I was giving mathematics lessons to a student of the gymnasium who was not able to follow classes and dumped several exams. We managed to get her grades up and in the end she managed to get a 10 (comparable to a 12 in Denmark) for mathematics. This felt really very good.

After I started to work at the university as a technician to start with and later a master and PhD student, I was involved in training university students, technicians, PhD students and Postdocs in immunology, biochemistry, molecular biology, and animal handling. I really enjoyed teaching them, and make them do the work for the different projects. The interesting part was that each student was different, and had to be trained in a different way. Some were easy to catch things other took a long time. For some we needed special tactics to make them learn things. Some were more theoretic others needed more visual images to be able to understand. I learned to come up with practical examples that were able to make a point, or explain things in a different way.

When I started to work in biotech companies, I organized courses for my employees to expand their know how on immunology. The goal of this training was to make them aware of the different technologies, and become more independent of supervision, be able to evaluate data and experimental setups and be able to adjust them independently, and improve the work they were doing.

The last several years I have been busy together with my wife setting up our own biotech company. We have developed our own hypothesis for the development and treatment of diseases and in particular brain diseases. Working in our own company the teaching experience we have had was that we needed to teach potential investors why our hypothesis and medicine is working. The difficulty is that the medicine works quite different than any medicine on the market for MS, Depression and Alzheimer. Therefore, most investors are skeptic to begin with and try to find all kinds of flaws in our theories. As the owners our goal is within 1 hour be able to make the investor see why our theory is so good, and explain all the upcoming questions and theoretical thoughts the investors can come up with.

In 2009 I started working at the Ingeniørs Højskole Aarhus, now the Engineering Highschool Aarhus University. Below you can see a table with courses I have given and are busy teaching at the moment.

When	Course	Semester	ECTS-points
Spring 2009	Industrial Fermentation	4 th Tech. Bach.	5
Fall 2009	Production Planning	1 th Civ. Eng.	5
Spring 2010	Process development and documentation	6 th Dipl. Eng.	10
Spring 2010	Immunology	6 th Dipl. Eng.	5
Spring 2010	Biomedical production	6 th Dipl. Eng.	5
Fall 2010	Production Planning	1 th Civ. Eng.	5
Spring 2011	Process development and documentation	6 th Dipl. Eng.	10
Spring 2011	Immunology	6 th Dipl. Eng.	5
Fall 2011	Production Planning	1 th Civ. Eng.	5
Spring 2012	Company and Production management	6 th Dipl. Eng.	5
Spring 2012	Immunology	6 th Dipl. Eng.	5
Spring 2012	Biomedical production	6 th Dipl. Eng.	5
Fall 2009	Project supervisor	5 th Dipl. Eng.	30
Fall 2010	Project supervisor	5 th Dipl. Eng.	30
Fall 2010	Bachelor supervisor	7 th Dipl. Eng.	20
Fall 2011	Project supervisor	5 th Dipl. Eng.	30
Fall 2011	Bachelor supervisor	7 th Dipl. Eng.	20
Spring 2012	Research project supervisor	3 th Civ. Eng.	5

The course Industrial fermentation was later changed into Biomedical production. The course Production planning is the same as Company and Production management and they are in essence the same as Process development and documentation. The difference between the Production planning/ company and production management and Process development and documentation is that the latter is 10 ECTS, and uses more time to go over the material as the first 2 which are 5 ECTS. The difference between production planning and company and production management is that the first was given to civil engineer students and the latter to diplom engineer students.

The courses biomedical production and Immunology changed format from the earlier years to the one given in 2012. I will go into this later in this portfolio.

In general, all courses are given in English. This was one of the wishes of the engineering highschool when I started. They wanted the students to get experience to follow lectures in English.

In the start students were surprised of getting taught in English. This was especially for the students of the engineering highschool less for the university students. I think they have been encountered more by English as

a teaching language. I have had one student that was not able to talk English. In this case other students in the class helped her and when this was not possible, I could explain things in Danish. However the question was if she really did not understand English or did not want to understand it. When lecturing I had the feeling she understood most of what I said. But furthermore, it was fine. There is a problem that students do not like very much talking English, but after pushing the students a little bit, that do fine.

I have the advantage that I can speak and read Danish; therefore, when problems in understanding arise I can help them further that way. But it is crucial to keep to that all should be in English. The times I did not do that, they often started speaking Danish. I believe it is crucial that teachers also when they speak English in class are able to speak Danish. This can put some burden on foreign teachers where they need to learn Danish. But in my experience there will always come situations where the English know how of the students is not enough, and when speaking and understanding Danish as a teacher, this difficulty can be overcome.

On the other hand, if the teacher does not speak Danish, the students are forced to speak English and understand it. This will make the student put more effort in trying to learn and use the language. When I moved to the USA, and my daughters were put into preschool they had to learn the language and within 6 months they were fluid in English. The same thing happened when we I moved to Germany a few years later and my daughters had to learn German, they learned it within 6 months and were fluid. In that respect one could argue for a teacher not speaking Danish will make the students faster learn and use the language. However, the focus of teaching should be on the matter to be taught and not the language.

Teaching courses

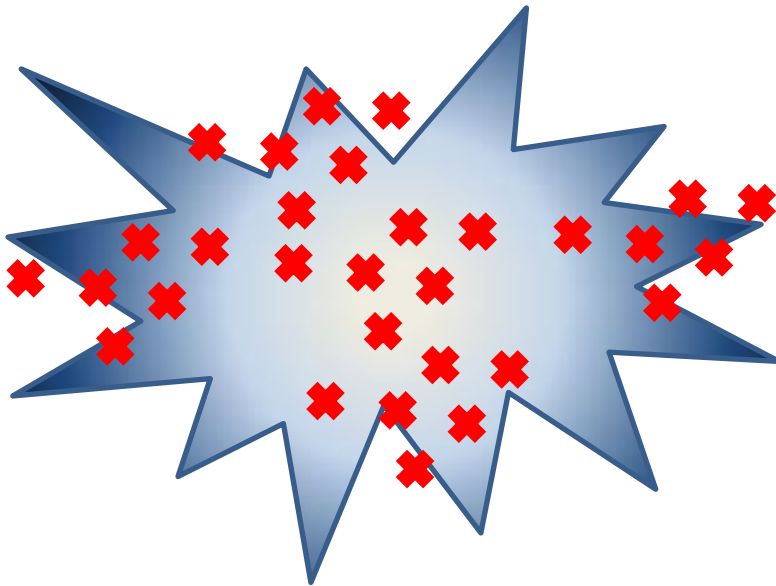
When	Course	ECTS
Fall 2010	Kick-off Adjunct training	1 day
Fall 2011	Adjunct phase 1	1
Spring 2011	Adjunct phase 2 Appendix 1	1
Spring 2011	Adjunct phase 3 Appendix 2	1
Fall 2011	Master of Problem Based Learning- PBL models and change strategies	5
Spring 2012	Port Folio	2

Basic teaching views

In principle I expect students that come to my classes to be interested and able in learning things that are important to become an engineer. I have the advantage that the students that come to my classes are 3rd year and later students. The ones that are not able to become an engineer because they do not have the mind set or ability they have stopped the study earlier.

This is a topic that is not so easy to write. I started thinking of this as when do you/ I learn most. When I think of that question, then I would say I learn most when I try things out and go to the border when experiments or things start going from optimal to bad. When I am able to find where a system is working and with what

parameters it stops working or goes bad. I can start optimizing a system procedure and gain the most knowledge



Look at the figure to the left. When I have an area where all parameters are incorporated and a system works. The functioning of the system is represented by the intensity of the blue color, the bluer it is, and the better the system works. I can do different tests (red crosses). Most tests will go fine, some with better results as others. We do not exactly know where the borders of going fine to failing are until we get experiments that do not work. When things fail we start learning important things of what we study, we can start narrowing in what the limits of success or failure are. In other words we need to try

things out and not be afraid to make the system fail. This is of course a research way of going to things. The question is if this is a real ground principle of learning or not. We try out different methods and see what works and what goes wrong. Then discard the bad experiences and methods and only use the best until we find an optimal way. In time this optimum will change with experience and new know how that comes in. This means this border of working and not working is constantly changing with the experience we gain. This way of learning things has been researched in an article from Prather, where he showed that using a trial and error concept gives more stress resistant and most know how transfer compared to a error free method of learning (Prather 1971)

As a teacher it is my task to bring know how I have gained by years of trying out in different biotech and management disciplines over to the students.

What is for me, the ground teaching principle I have that works for me the best?

Thinking about this question, and thinking about my teaching methods, I am someone that uses trial and error assignments to make students find out. I use figures and cartoons, comparisons to make things visible, and then let the students try things out. When I talk about trial and error, I do not mean with my teaching, but with making the students try things out, guide them and let them make mistakes in what they are doing. I do this by giving them tasks that are often open, or are free in a lot of different ways, like with setting up a company on paper. One can give the students tools and know how, but they only learn the value when using it and see how far they can go until it goes wrong, and they have to adjust their vision.

I see students as researchers that, I try to help, figure things out.

This is based on the systemic thinking or narrative education principle which is "It is impossible to teach others. It is for an educator, trainer and facilitator only possible to create conditions for learning.

This is done by creating enough sense to make it possible for others to learn in the "current bandwidth". There can only be learned if the material presented makes sense. Training and education is not primarily about goals, but about meaning - and practice. You get better at doing what you do. "(Jerome Bruner 1998, 1999, 2004/2009)

The consequence of this way of thinking is that I teach by going over the material in class, try to make its content and logic/sense visible by using comparisons with real life situations I have from working in Biotech industry, research or more basic examples in completely different settings. Then let students try things out and work with the know-how.

This principle can give its limitations, because there are students that just want to get the material they have to study and be able to reproduce it. They need a book they can read and that is it. It is my belief that a student does not learn anything from reading and be able to reproduce things.

The number 0 means nothing the value 0 means a lot. To see a 0 and reproduce it therefore means nothing. To understand a 0 and be able to use it means everything.

In other words students need to use the information they have gone through in order to understand it. And best would be if they can use the information put in perspective of a relevant situation.

However, in contrast to this view, students sometimes need to learn basic principles and rules to be able to apply them later on, or when students have to try things out they lose a lot of time with things that do not work or gave the wrong results. And they have to see meaning in what was presented, and meaning on spending time of failed experiments and work. In other words it could sometimes be a long road to get to a certain gain of know-how, or it could be that it is difficult to make all students see meaning in the presented.

One other teaching view I have is that I have noticed that quite a number of students have a problem to step forward or say things in class, especially when they have to say things in a different language. In that case I have seen and found it is best to force the student to come out and say something. When they have done that once or twice, a barrier is overcome and it is easier and easier every next time.

How can one force students to come out and say something?

Looking at this question, one gets imaginations of a bully forcing the words out of the student, which is not the way to go. It will make the student afraid and maybe can even make them not able to ask or say anything anymore. The goal is to create an environment where students will feel safe, understood and free to say or ask things. The students should feel they can make mistakes in the matter discussed as well as the language, and not afraid to ask the imaginary "stupid question".

There are different kinds of students. There are students that are open and not afraid, ones that are shy, the ones that are in class because it was an obligatory course and several more variations of these. When these discussions are initiated in class the open and free students will normally ask the questions and the others sit on the sideline waiting hoping they do not have to say anything. One could make the ones that just follow an obligatory course and are free and open make ask questions or bring something in by making this, of coming with input, part of their curriculum, and when they do not ask or say something they will be graded a -3 which means they will have to compensate this by other grades. This works in that students then start saying things, or asking things and this way get started and maybe even engaged. However the shy ones will not so easy fall for this. Here besides making it part of their curriculum, one has to create a safe and open environment, an environment where ideas and thoughts are valuable and appreciated.

If one has such an environment, then a way of getting students going, is by asking, a student that has a hard time coming with a question or comment, if he or she understood the presented, or what he/she think about one or another topic, and this way make them think about things, reflect about things and start wondering and answer the question one asked.

The final goal is to get each student involved in the class and think about the things that are told or presented. Often it will be like having them step like they say in Dutch over the doorstep, once you have done this step the rest comes more easily and in the end it goes naturally.

Description, discussion and reflection of practice

For this section I want to focus on the courses Process development and documentation, Company and Production management and Production Planning as one block, and on the course Immunology as another block. In addition I want to go in the research I have been setting up and we are implementing in teaching.

Management course

The courses Process development and documentation, Company and Production management and Production Planning are in principle the same course. The difference is that Process development and documentation is a 10ECTS course given at the diplom engineer level 6th semester, and the other 2 course are 5 ECTS courses, where Company and Production management is a replacement of the course given at the diplom engineer level 6th semester and Production Planning at the civil engineer level 1st semester.

When I started teaching at the engineering high school, I overtook the course from another teacher. I was given the course description and had to develop my own material. The course was originally given in Danish, but that was changed to English. The exam was, the first time the course was given (to civ engineer students), a 24hr exam. In a 24 hr. exam, students have to evaluate and oppose and comment on task other students have worked on during the course.

After the first time I taught the course, I started changing it. The new way the course was build up was in such a way, that students get the tasks to set up a production process/company where the students work in groups and each group works on a different process/company.

The first time I taught the course, I selected 6 processes/products that the students could choose from. This way I made sure the students will start coming in to processes and products I thought were important and educational. However, the second time I taught the course, I decided to let it be more free. I tried this out to see where the students come up with when they themselves have to select topics/products. I felt I was holding them in one way too much by the hand by selecting products in the other way I also limited their freedom and therefore, it could well be they could not find a product they could really burn for or identify themselves with. This like discussed earlier, is much more in line with the systemic thing way of teaching.

The students could themselves define a production process. I put however one limit on the selection in that the production process should involve an organism.

The organism could be the means, the product or involved in a production of a material needed in the production.

In the first instance I was a little afraid that they should all come back with the same process. But as it turned out in all the time I have given the course until now, I have not seen one product that is the same. It showed for me, that I have to be careful not to think too critical and give students much more influence and freedom.

The work in the groups is really well and I knew I did it right when I heard students really going into detail. As an example I can refer to one group that was working on setting up a company that produced cheap white wine. At some point at the end of the course while calculating the economy of the process, I heard the students say: "but if we want to make sure that the alcohol percentage is the same, then we are needed to make sure we have a constant sugar amount in the process. That means we will need to buy sugar and this will cost money, so what is the effect of this on the economy of our company".

The critique I get from the students is that they expect more control and lectures from me. I always teach in such a way that I have lectures and then let them work on the project and go around.

When no questions are coming anymore, I will go back to my desk and come back from time to time to see if they have questions or tell them they can always get me when needed.

This sometimes gives the critique that the students think I am not too much interested in them, where I see this as letting them take control of the process.

In the beginning with the course where they write a business plan, the exam was a written exam to test them in the different topics, but I changed that quickly. Because a written exam only tests them in the general topics and I think it is very important to hear what is behind the choices they made during the process of setting up the company. That time second time the exam was writing a business plan and they had to present the different topics during class along the way. During the presentation, I had other students ask questions about the presented. These questions/critiques could then be used to optimize the part the group had worked on.

I individually evaluated the presentations and questions they asked and the business plan was evaluated per group. This gave an individual grading for each student.

This way of examination was fine in that all students got the chance to present part of the company and had to defend the choices that were made for the other students. In addition, the other students were trained to think critically about what was presented for them, and thereby I hoped to train them also in thinking critically about their own work. This worked to some extent in that the students started asking question after I encouraged them and also when it was clear to them they needed to be involved in order not to get a bad grade. However, I was not completely satisfied since each student did not have to be able to understand all of what was worked on by setting up the company, and production process.

Therefore, in the next examination, I changed the exam in such a way that the students had to present their business plan to me and the censor and then individually had to defend their business plan as if the censor and I were an investment company/person/venture capital they had to convince to invest in their company they wanted to start.

The censor I chose were selected on that they had business experience. I had an ex-business manager of an electronics company once or a person that was a CEO of a biotech company and used to work for a venture capital company.

This worked really well. Students get into the role of being an entrepreneur. They prepare themselves and make the business plan interesting and inviting to read. One student's husband was busy starting a company and she could help him write the business plan. The course is not just writing the business plan. The goal is that by writing this they get an insight in how a company runs. You just do not hire people you calculate how much people you need and if you need, 3,25 person, then find a solution to get the work done for low cost, but not having one person work over all the time. Also where you put the company is not at random. When do you order your raw materials, how much do you order, where do you order etc.etc.etc.. All these things are taken into account.

I have the feeling the course works really well. It prepares students for the world after their study, in which a company economy is as important as the product. As is the experience over time, some students will start their own company or end up in management in a company.

I constantly try to improve the course by adding topics like lean and other production methods, and take out them that are not as relevant.

The exam was really important. In the last times I gave the course to have them defend the business plan and justify their choices for a potential investor, make them think about the things they present and were taught in class. A written exam is not right, because in my view this makes the student only reproduce the material and not show they are able to apply it to a "real life" situation, and just writing the business plan is also not good, since in the end it is what they thought when they made their choices which is the most important. Questions like why and how, and what for, are difficult to get out of just the business plan and can easily be tested during a defense of the business plan.

Immunology course

I started teaching the immunology course as a course where I provided lectures in different topics. The first time, I specifically had chosen not to use a book. The reason for that was that I wanted the student to look things up on the internet, and that way find the information, and work with it.

I gave them places to look and sometimes gave websites to look at and also some texts from a book.

In a way this worked really well. It saved the students buying a book, and they were very active finding all things and getting things different ways. But there were a few students that had a hard time. It turned out a book is a kind of security for them. They feel safe. Some of the students started to look for a book by themselves and buying it. All students passed the course. Therefore, I feel they learned what was needed, some with a 12.

The second time I taught the course I selected a small Danish book. That was ok, but not the best. I still told them to go to websites and look on the internet. The course went fine but 2 students failed. One did not show up in all lectures and was therefore, expected to fail. The other did not pass the exam. The last one did a re-exam, and passed that time, having more focused on the exam.

In the mean time I changed the course to a project course. The reason for that is that not always there are enough students to follow the course. By teaching it as a project groups of 3 students make the course economical feasible.

The way the course goes, is that I make 7 pages with questions in immunology, each page with a different focus. The students then have to prepare for each page with questions a powerpoint presentation where they explain in detail the things they should go over, and the questions on the page should be answered. During the time they as a group present the presentation, I interrupt the presentation and ask at random to the different student questions on the presented, where we go deeper in the matter.

If the students can answer all the questions from me and the presentation is fine, they pass, and can go to the next part. They have to pass all 7 pages, to pass the course which is graded as passed/not passed. If they do not pass a specific part, then the next time they present the next part they have to answer the parts they did not satisfactory answered last time.

The advantage for the students is they are in complete control. They can decide when they do the next part they can spread it over a whole semester or just a few weeks, they can even do it in the vacation time.

The critiques I get are very positive. The only negative critique is that they students use much more time on preparing for this course as the time they use to prepare for a normal course. But in the end they learn much more and are very actively working with the material.

My experience is that this way of lecturing is very intense and fun. The method was developed in our institute by Stig Ravn, and we have implemented the method now in several “valg” courses.

However to all positive points there are also some negative ones. These negative points are that it is more difficult to steer the group in directions one wants. Even though the students work very hard the contact hours with the students are very few. This makes that there is less time to guide the students and help them in some right directions. If students go wild or do not do the task right it can cost them quite some time to correct that. With more classroom teaching these problems can be prevented. In addition it takes a lot of self-discipline of the students. This way of teaching can therefore, according to me, best be used by students in the last semesters. Since these students have learned how to do things, during the normal courses and project work. They are more mature, and disciplined.

Economical this way of teaching small groups of student following a course is profitable, since with only 3-4 students per group a 5ECTS course can be profitable. This makes it possible to teach in more “valgag” topics, and thereby give the students more possibilities to specialize themselves, and becoming an engineer of their choice.

Conclusions

The pedagogical course has learned me very much. I look at student in a different way. In the beginning it was scarier to teach, and stand in front of a class, hoping everything went all right. Now I am more prepared, have thought much more about lectures, prepared them and build the course up more logical, and the students are more like colleagues. We both have a job, mine is to present them know how, and theirs is to pick out of this know how these things that interest them and give meaning for them be able to use the know how . I try out all kinds of things in the classes to make the material more interesting and visible, and see how it works. I try out evaluation methods, I try to improve the things that do not work so well, and optimize every time I teach the topics. I have learned to be more aware of the students in how they respond to the material I present and teach. When I notice I start overloading them, or the interest is failing, I have them take a short break so all can get time to become more open again for new material, and also have a chance to think about the things that were presented and come up with questions.

I try to find small games/practical exercises to help make the point or make them aware of small challenges with the material and make them use the information presented earlier.

Like in management education, I have a 6 x 6 tic tac toe game with 3 groups “competing” with each other, where they have to find out to work together, talk to each other, to get the most out of the game and the highest reward.

I learned that I have to be aware of not stepping in too high concerning expectations of what they know. I have to get more down and when I see they know the things I presented go up in difficulty. In addition, I learned some good tools to evaluate what the students got out of the class with just help of for instance a few post its.

Every time I learn something new.

I found out that it is important how the exam is given. It should be in line with the course. But it is not always so easy to find out what is in line with the course. Like I described in appendix 1 page 16 and 17 in the experiment in the end the business plan with the oral report was the best for this course and the information they needed to learn. The ideas behind this way of teaching and the way the exam is, is that the information is praxis near, setting up a company, and all/most information is being used and trained making the business plan and defense. The company the students set up on paper is something they find interesting and close to their normal daily life. They try things out by calculating the different variables and try to find out the optimal scenario that gives the most sense and the best results. There are different ways and different endpoints. This is what I call a research way of coming in new fields. Trying things out in praxis or on paper and come to the for each person most optimal scenario/end result.

For the immunology course teaching the course as a project is very exciting and makes students work really hard on the matter they need to learn.

The student say the need much more time to learn all then what they are used in class. But this I think is in order since most of the students in class lectures only use part of the time they should be using on the course material. The other advantage is that the students can self fill in how they want to learn the material and which tempo. This means they can put it at times they have space/time to do it, for example when they do not have exams for other courses etc.

For the education the advantage is that we can now provide more free choice courses and give students the opportunity to specialize in more different directions. Especially in our education until now where we had around 20 students per year in the final year. It is difficult to fill classes when you need at least 10 students per class. Therefore, the students benefit from this teaching method and for the teachers it is more fun, since the contact hours in these courses are very intense and often discussions come up or go in all kinds of direction challenging also the teacher.

In the beginning when I started teaching I was going into a class and hoped for the best. I prepared myself of course, but missed techniques when things did not work out how I wanted it, and was more focused on the material to be taught as on the students and how they reacted on the material and information I gave them.

Now I am at a stage where I can do things or change things and use evaluation methods to see how things are going. I can be freer and do not have to be afraid I get stuck. I also learned that it is difficult to satisfy all.

I have had that one year I used the feedback of the evaluation of the course to change things. The next time after I had implemented this change because of the feedback, I got the complete opposite critique. This gave me the confidence that I have to follow my feelings. This does not mean I am not open for critique or willingness to change. This means I have to judge if the critique was justified and if the possible change I would have to do could work out, and what the effect would be if I did so.

Where from here

When I finish this course, I have not finished a course but I start a new phase in my teaching career, where I am better prepared but still have very much to learn. I will try out new things I learn or hear from other colleagues. I will go to conferences and find other things to try out. Listen to other teachers, look on the net and see how I can optimize my courses.

This course was a very good experience, now I have to learn more.

I got interested in teaching and trying out these new methods like project teaching made me aware of the fast majority of things in teaching I do not know. It also shows me that teaching in an economical sensible way does not mean you have to go down in quality. This project teaching shows we make the students work harder and in more depth with the same material.

I was glad to follow his course. I also am convinced that now after having followed the course that now that we are fused with the university and we will get PhD students come in that want to teach we will have to make them follow such courses before or while they are allowed to teach. Because we need to guarantee that the students receive education on a high level. This will help both the PhD students that maybe think of an academic career as well as the students that follow the course because the quality of teaching will go up. However the first 4 semesters of the diplom engineer study we will need to have full time teachers in to do the teaching. The reason is that here we lay the basis of the whole study. We need to guarantee that the teaching is at a high educational level, that we can secure that between courses there is a smooth transition, and that also from one to the other semester the transition is good. The best way to me to reach this goal is by having teachers talk to each other share know how on the courses. In addition, by talking to each other one can discuss problems one comes up with in class, or ideas one have share with others. This gives, as I experience every day in our group, a synergy in the group that makes all come on a higher level. After the first 4 semester we have a praxis semester where students go work in a company, and after that there are 2 semesters with free choice courses and the bachelor project. The free choice courses could be given by people that are not part for the permanent teaching group. But we need to also have them come in from time to time to discuss the study in general. That teachers are not full time teachers has benefits and disadvantages. The disadvantages are that there is not a group harmony and no synergy and it is harder to make the different courses be in line with each other. The advantages with having other teachers that come in for a few course, is that the staff is more flexible and more front line research can be brought into the courses, however, this is predominantly important for the last year bachelor and master students.

Teaching and being taught is important always and every day.

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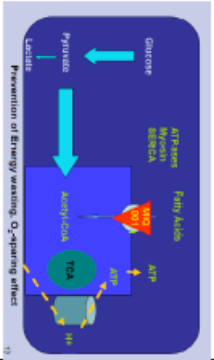
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			<p>For mig er undervise hjælpe studerter lave fejl og lære fra det</p> <p>Lave fejl er eneste møde til at blive bedre.</p> <p>Fra PG20 forventer jeg til at lære blive bedre i formler lærestof</p>

Teaching experiment in BP6OPS1

A production/company management course

Experiment in evaluation of the Production/company management course.



Goal of the experiment was to find a better way to evaluate the course. In the beginning we had made a 24hr exam, where each students were set to evaluate the projects other groups had made.

The should find the positive and negative points and suggestions. This way of examination had a few disadvantages:

1st with 25 students this means a lot of reading for the evaluation (size of exam reports were 12-20 pages.

2nd Since there are so many students and the exam takes 24hrs there is a chance students help each other, or they get help from 3rd people

3rd The exam is as good as the projects the students made.

In an alternative approach I tried to give a 4 hrs. written exam .

The advantage is that the amount of the to be evaluated material is limited, and there is control over whom is answering the questions. In addition, the level is steered by me and not the students quality of work. The disadvantage is that you measure more how good they can reproduce what they did and not how they can apply this.

Therefore, I tried last autumn to organize the course in such a way that the students in a group write a business plan on an imaginary company they started. They could choose from 6 different companies, where in each company there was one step in which there was a fermentation.

They got taught in the different topics and each week one of the group has to present a topic they had to organize for their company and the students got evaluated for their presentation. In addition were all the members of one of the other group summoned to ask questions on the presented and these students were evaluated by me on their questioning.

Then in the end the final business plan had to be written and was evaluated as a group thing. The final score was the mean of the group grade and the individual grades.

This way of evaluating was really fine, however, it was difficult to estimate if all students knew everything of their written plan and business plan.

Therefore this spring I changed the course in such a way that the students had to also come up with a company in which the only criteria was there was at least 1 organism used to generate the product, and they got taught in all the topics. Again all students at one time had to present part of their company and the others had to ask questions. Then the exam was that the students had to write the business plan and they had to present it for me (the examiner) and the censor where we should be seen as venture capital investors/bank people or private investors. Then after the presentation they had to defend their business plan and the goal was to convince us they should get the investment, the company was valid and could be working.

This kind of exam worked really well, and we really got an idea of how good the students knew their plan with faults and good things.

One of the critiques of the students to the course was that it was not clear at the start of each teaching lesson, what they should use it for.

This critique is I think part of the way the course is given. Each hour the students were given lectures on a topic, and every time a different topic. In the end the students ad all the tools, and they could use it to generate the plan and run a paper company/production process.

In the end it was clear they understood all the things, only when working with it they could not see how it fit in.

This is the part where students get the general overview and are able to apply what they learned to new things (active learning).

	Examen	Advantage	Disadvantage
1st	24Timers opposition of the different group tasks of different groups	1. The students look critical at each other's work	1. Difficult to make sure students personally answer exam 2. The level of the exam is as good as the different groups did their tasks 3. Lot of pages to evaluate
2nd	4 hrs written questions following an imaginary project	1. The level of the exam decided by the teacher 2. Limited amount of corrections to do 3. It can be made sure all topics are covered	1. Only the direct knowledge is tested. There is not much innovative thinking and combination of taught material needed.
3rd	Business plan with presentation/questioning i classroom	1. The students have to combine all know how into one document 2. The students have to combine different topics 3. Are trained in being critical to presented work, and therefore also to their own work 4. Re on top of all they work on and have answers ready or shall be able to answer questions ad-hoc	1. It is difficult to see if in the end the student has all know how of the whole report. 2. How much the student worked with all topics
4th	Business plan with oral group presentation and individual defense	1. The students have to combine all know how into one document 2. The students have to combine different topics 3. Are trained in being critical to presented work, and therefore also to their own work 4. Re on top of all they work on and have answers ready or shall be able to answer questions ad-hoc 5. The students are individually tested for their know how and overview	

Deltagerbevis for



Pædagogisk Grundkursus

Det bekræftes hermed at

John Nieland

Ingeniørhøjskolen i Århus

Har deltaget i det Pædagogiske Grundkursus

PG20 i efteråret 2010 - foråret 2011

Hans-Jørgen Kristensen

Aage Birkkjær Lauritsen



Aalborg, 4 June 2012

To whom it may concern

This is to confirm that John Nieland, student at Aalborg University has passed the following exams at Module 2 of the Master in Problem Based Learning:

PBL models and Change strategies (5 ECTS)

Learning outcomes

After completion of the course the participants should have accomplished knowledge in order to:

- ☐ Explain fundamental PBL learning principles.
- ☐ Explain specific PBL models, including the Aalborg Model
- ☐ Explain concepts and models for organisational change

After completion of the course the participants should be able to:

- ☐ Analyse advantages and disadvantages of diverse learning theories and PBL principles
- ☐ Apply theories and methods to implement development strategies and action plans for the encouragement of PBL models.
- ☐ Analyse the organisational change processes in an implementation process.

After completion of the course the participant should have obtained competences in order to:

- ☐ Discuss fundamental PBL learning principles and specific PBL models.
- ☐ Discuss advantages and disadvantages of diverse PBL models taking the institutional framework into consideration.
- ☐ Design pedagogic experiments for the educational institutions.

Content

The course contains:

1. The background for PBL
2. PBL principles
3. PBL traditions and change strategies
4. Comparison of different PBL models
5. Strategies and methods for pedagogic development.

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